Science Standards of Learning

Sample Scope & Sequence

Kindergarten

Commonwealth of Virginia
Department of Education
Richmond, Virginia
2003

Virginia Department of Education
P.O. Box 2120
Richmond, Virginia 23218-2120
http://www.doe.virginia.gov

Superintendent of Public Instruction
Jo Lynne DeMary

Deputy Superintendent for Instruction
Patricia I. Wright

Assistant Superintendent for Instruction
Linda M. Wallinger

Office of Elementary Instructional Services
Linda Poorbaugh, Director
Paula J. Klonowski, Science Specialist

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Preface

As an additional resource to help school divisions develop curricula aligned to the 2003 Standards of Learning, the Virginia Department of Education has developed sample scope and sequence documents for kindergarten through grade eight and for core high school courses. These sample documents provide guidance on how the essential knowledge, skills, and processes that are identified in the Standards of Learning and the Standards of Learning Curriculum Frameworks may be introduced to students in a logical, sequential, and meaningful manner.

These sample scope and sequence documents are intended to serve as general guides to help teachers and curriculum developers align their curricula and instruction to support the Standards of Learning. Each sample document is organized around specific topics to help teachers present information in an organized, articulated manner. Also included are correlations to the Standards of Learning for that curricular area for a particular grade level or course, as well as ideas for classroom assessments and teaching resources.

The sample scope and sequence documents are not intended to prescribe how curriculum should be developed or how instruction should be delivered. Instead, they provide examples showing how teachers and school divisions might present to students in a logical and effective manner information that has been aligned with the Standards of Learning. School divisions that need assistance in developing curricula aligned with the Standards of Learning are encouraged to consider the sample scope and sequence guides. Teachers who use the documents should correlate the content identified in the guides with available instructional resources and develop lesson plans to support instruction.

The *Science Standards of Learning Sample Scope and Sequence* and the *Science Standards of Learning Curriculum Framework* can be found in both PDF and Microsoft Word file formats on the Virginia Department of Education's Web site at http://www.doe.virginia.gov/VDOE/Instruction/sol.html.

Introduction

The following sample scope and sequence is based on the essential content, skills, and processes developed for each Kindergarten standard in the *Science Standards of Learning Curriculum Framework*. It is not intended to be a complete or exhaustive set of all that students should master at this level, but instead the scope and sequence organizes a core of key skills, content, and processes around basic topic areas.

The topic areas generally correspond to individual standards; however, certain standards are reorganized and grouped with components of other standards to comprise meaningful instructional clusters. The various topics are not intended to require equal instructional time. Additional objectives have not been developed, and no attempt has been made to transition or further explain the content. Additional information may be obtained from the overview and introductory sections of the Kindergarten *Science Standards of Learning Curriculum Framework* (http://www.doe.virginia.gov/VDOE/Instruction/Science/sciCF.html).

An important and consistent thread among these organizational topics is the application of inquiry skills throughout. Students should have an opportunity to master the various science concepts in each topic area in the context of active learning and inquiry processes. The focus on inquiry is further reinforced by having the first topic in the scope and sequence as a discrete treatment of the science skills; however, a discrete treatment is certainly not required. This represents only one way to organize instruction; there are many other valid and useful organizational schemes.

Effective science teaching requires assessing and understanding what students know and need to learn and then challenging and supporting them to learn it well. The array of effective assessment techniques that teachers can employ in the classroom goes well beyond traditional assessments, and science instruction lends itself well to alternative approaches such as portfolios, student self assessments, and short videotaped presentations. The assessments mentioned in the scope and sequence are intended to be general. It is the role of the local curriculum to develop a detailed review of what is most effective for the particular concept being developed.

The resources section included in this scope and sequence provides a brief sample of instructional resources and staff development materials that are generally available without charge. There is a significant body of commercially available instructional materials that correlates well with the Science Standards of Learning and is of very high quality. This document, however, does not include references to those materials.

Organizing Topic	Related Standards
Investigating the Five Senses	**K.2, K.1**
Describing Our World	**K.1a-e, K.4**
Measuring, Sequencing, and Questioning	**K.1f-i**
Investigating Water	**K.5, K.1**
Investigating Sunlight and Shadows	**K.7, K.1**
Investigating Change	**K.9, K.8c, K.1**
Investigating Patterns	**K.8a,b,d, K.1**
Investigating Magnet	**K.3, K.1**
Investigating Plants and Animals	**K.6, K.8c, K.1**
Investigating Recycling	**K.10, K.1**

Organizing Topic	Essential Knowledge, Skills, and Processes	Related SOL	Sample Classroom Assessment Methods	Sample Resources
Investigating the Five Senses (A discrete introduction to specific science skills is not necessary, as all of the inquiry skills should be incorporated within the following topical areas. Teachers may consider introducing some of these skills in isolation or coordinated with mathematics, English, and history instruction.)	**Students should be able to:**		Student demonstrations Classroom observations Student work	*Teaching and Learning the Basic Science Skills* videotape teacher training series, site guide: http://www.doe.virginia.gov/VDOE/Instruction/sol.html SOL assessment blueprints and sample items: http://www.doe.virginia.gov/VDOE/Assessment/soltests/ *Science SOL Curriculum Framework:* http://www.doe.virginia.gov/VDOE/Instruction/Science/sciCF.html
	identify and describe the five senses: taste, touch, smell, hearing, and sight. match each sensing organ (eyes, ears, nose, tongue, and skin) with its associated sense. match sensory descriptors with the senses (taste: sweet, sour, bitter, salty; touch: smooth, hard, soft, cold, warm, hot; hearing: loud, soft, high, low; sight: bright, dull, color, black, and white.)	K.2		
	observe objects and describe their basic properties. These include color, shape (circle, triangle, square, and rectangle), size (big, little, large, small), texture (rough, smooth, hard, soft), weight (heavy, light). apply the K.1 science skills in the context of the content of this topic.	K.1a		

Organizing Topic	Essential Knowledge, Skills, and Processes	Related SOL	Sample Classroom Assessment Methods	Sample Resources
Describing Our World	**Students should be able to:**		Student demonstrations Classroom observations Student work	*Teaching and Learning the Basic Science Skills* videotape teacher training series, site guide: http://www.doe.virginia.gov/VDOE/Instruction/sol.html
	identify and name eight basic colors, including red, orange, yellow, green, blue, and purple. (Indigo and violet are not required at the kindergarten level.) Black and white are not spectral colors, but students should recognize them by name.	K.4a		
	observe objects and describe their basic properties. These include color, shape (circle, triangle, square, and rectangle), size (big, little, large, small), texture (rough, smooth, hard, soft), weight (heavy, light).	K.1a, K.4		
	compare and contrast objects that are rough, smooth, hard, and soft.	K.4c		
	compare objects, using the concepts of heavy/light, long/short, wide/thin, big/little, and large/small. measure objects, using nonstandard units.	K.4d		
	identify the position of an object, using position words: over/under, in/out, above/below, left/right.	K.4e		

Organizing Topic	Essential Knowledge, Skills, and Processes	Related SOL	Sample Classroom Assessment Methods	Sample Resources
Describing Our World (continued)	observe an object or objects from multiple positions to achieve different perspectives. In order to accomplish this, the student should look at the object from top, bottom, front and back.	K.1b		
	arrange a set of objects in sequence according to size.	K.1c		
	separate a set of objects into two groups based on a single physical attribute, including size, color, texture, and weight.	K.1d		
	group objects according to their speed—fast or slow.	K.4e		
	construct picture graphs using 10 or fewer units.	K.1e		
	identify and name a circle, triangle, square, and rectangle. compare and contrast objects that are flexible, stiff, straight, and curved.	K.4b K.4e		
	describe objects both pictorially and verbally.	K.1i		

Organizing Topic	Essential Knowledge, Skills, and Processes	Related SOL	Sample Classroom Assessment Methods	Sample Resources
Measuring, Sequencing, and Questioning	**Students should be able to:**		Student demonstrations Classroom observations Student work	*Teaching and Learning the Basic Science Skills* videotape teacher training series, site guide: http://www.doe.virginia.gov/VDOE/Instruction/sol.html
	measure common objects with nonstandard units. Examples of nonstandard units include hands, pennies, and paper clips.	K.1f		
	predict an unseen member in a sequence of objects to complete a pattern.	K.1g		
	develop a question from one or more observations.	K.1h		
	identify unusual or unexpected results in an activity.	K.1j		

Organizing Topic	Essential Knowledge, Skills, and Processes	Related SOL	Sample Classroom Assessment Methods	Sample Resources
Investigating Water	**Students should be able to:**		Student demonstrations Classroom observations Student work	*Physical Science SOLutions* module: http://www.smv.org/pubs/index.html
	identify examples of the different states of water (solid, liquid, and gas). classify examples of different states of matter as solid, liquid, or gas. describe the natural flow of water. predict where a stream of water will flow. predict whether items will float or sink when placed in water. Items to use include wood, metal, fruits, paper, and plastics.	K.5		
	apply the K.1 science skills in the context of the content of this topic.	K.1		

Organizing Topic	Essential Knowledge, Skills, and Processes	Related SOL	Sample Classroom Assessment Methods	Sample Resources
Investigating Sunlight and Shadows	**Students should be able to:**		Student demonstrations Classroom observations Student work	
	identify a shadow or variety of shadows. describe how to make a shadow. identify and describe sources of light—sun, electric lights, and flashlights—that can produce shadows. match objects with the shadow they would create. analyze how shadows change as the direction of the light source changes.	K.7		
	apply the K.1 science skills in the context of the content of this topic.	K.1		

Organizing Topic	Essential Knowledge, Skills, and Processes	Related SOL	Sample Classroom Assessment Methods	Sample Resources
Investigating Change	**Students should be able to:**		Student demonstrations Classroom observations Student work	
	identify some changes that people experience over time—height, weight, color of hair. predict how their own height and weight will change over the school year.	K.9		
	describe how animals and plants change as they grow. (Related to K.6.)	K.8c		
	describe how people cause things to change— e.g., demolition of buildings, construction of buildings, cutting down trees, planting trees, building highways. describe how things change naturally. This includes seasonal changes, the growth in seeds and common plants, common animals, including the butterfly, and the weather. identify examples of fast changes and slow changes. Slow changes should be the kinds of familiar changes that occur over weeks, months, or seasons. Students are not responsible for long-term changes.	K.9		
	apply the K.1 science skills in the context of the content of this topic.	K.1		

Organizing Topic	Essential Knowledge, Skills, and Processes	Related SOL	Sample Classroom Assessment Methods	Sample Resources
Investigating Patterns	**Students should be able to:**		Student demonstrations Classroom observations Student work	
	observe and identify daily weather conditions—sunny, rainy, cloudy, snowy, windy, warm, hot, cool, and cold. predict daily weather based on basic observable conditions. chart daily weather conditions. identify simple patterns in natural objects—veins in a leaf, spiral patterns in cones, shapes and colors of common seeds. identify and describe patterns in their daily schedule at home. identify and describe patterns in their daily schedule at school. distinguish between the patterns in home activities and those in school activities.	K.8a,b, d		
	apply the K.1 science skills in the context of the content of this topic	K.1		

Organizing Topic	Essential Knowledge, Skills, and Processes	Related SOL	Sample Classroom Assessment Methods	Sample Resources
Investigating Magnets	**Students should be able to:**		Student demonstrations Classroom observations Student work	*Physical Science SOLutions* module: http://www.smv.org/pubs/index.html
	predict and test which common objects will be attracted to magnets and which will not be attracted to magnets. classify objects as being attracted or not attracted to magnets such as iron nail, iron-bearing paper clip, cereal, and book. explain in their own words essential vocabulary, including the concepts of attraction/nonattraction, push/pull, attract/repel, and metal/nonmetal. identify items in the home that contain a magnet or magnets such as can openers, magnetized screwdrivers, magnetic games, and refrigerator magnets. evaluate the importance and usefulness of magnets in the home.	K.3		
	apply the K.1 science skills in the context of the content of this topic	K.1		

Organizing Topic	Essential Knowledge, Skills, and Processes	Related SOL	Sample Classroom Assessment Methods	Sample Resources
Investigating Plants and Animals	**Students should be able to:**		Student demonstrations Classroom observations Student work	*Our Living Environment* teacher training module: http://www.doe.virginia.gov/VDOE/Instruction/OurLivingEnvironment.doc *Project WILD:* http://www.dgif.state.va.us/education/wildlife_education.html *Project WILD Aquatic:* http://www.projectwild.org/materials/materials.htm *Project Learning Tree, K-8:* http://www.plt.org/
	describe the life needs of animals and plants. The life needs are food, water, and air. predict what will happen to animals and plants if life needs are not met. describe some simple changes animals and plants undergo during the life cycle. For animals this may include changes in color, body covering, and overall size. For plants this may include size, presence of leaves and branches and ability to produce flowers and fruits. compare and contrast young plants and animals with their parents, using pictures and/or live organisms.	K.6		
	apply the K.1 science skills in the context of the content of this topic	K.1		

Organizing Topic	Essential Knowledge, Skills, and Processes	Related SOL	Sample Classroom Assessment Methods	Sample Resources
Investigating Recycling	**Students should be able to:**		Student demonstrations Classroom observations Student work	*VA Natural Resources Education Guide:* http://www.vanaturally.org/guide.html *Pollution Solutions: Litter Prevention Activities for Virginia Teachers*: http://www.deq.state.va.us/education/polsul/
	give examples of objects, such as paper, plastic containers, and glass containers, that can be recycled. identify materials that can be reused. describe the difference between recycle and reuse. name ways to conserve water and energy. describe how to recycle a given material—paper, oil, aluminum, glass and plastics. predict what would happen if recycling and reusing were not practiced.	K.10		
	apply the K.1 science skills in the context of the content of this topic	K.1		